

REMARKS

The Examiner rejected claims 8-12 and 14-20 under 35 U.S.C. §103(a) as allegedly being unpatentable over Krivokapic et al. (U.S. Patent No. 6,579,750) in view of Houston (U.S. Patent No. 6,045,625).

The Examiner rejected claim 13 under 35 U.S.C. §103(a) as allegedly being unpatentable over Krivokapic et al. (U.S. Patent No. 6,579,750) in view of Houston (U.S. Patent No. 6,045,625) and Choi (U.S. Patent No. 6,383,849).

Applicants respectfully traverse the §103(a) rejections with the following arguments.

35 U.S.C. §103(a)

The Examiner rejected claims 8-12 and 14-20 under 35 U.S.C. §103(a) as allegedly being unpatentable over Krivokapic et al. (U.S. Patent No. 6,579,750) in view of Houston (U.S. Patent No. 6,045,625).

Claims 8-14

Applicants respectfully contend that claim 8 is not unpatentable over Krivokapic in view of Houston for at least the following reasons.

As a first reason why claim 8 is not unpatentable over Krivokapic in view of Houston is that Krivokapic in view of Houston does not teach or suggest the following feature of claim 8: "a semiconductor layer overlying a **buried insulator** having at least two layers" (emphasis added). The Examiner relies on FIG. 11 of Krivokapic for alleged disclosure of many of the features of claim 8. The Examiner has identified layer 16 in FIG. 11 of Krivokapic as the buried insulator of claim 8. However, Applicants respectfully contend that layer 16 of Krivokapic is not a buried insulator but is rather a shallow trench isolation. See Krivokapic, col. 2, line 63. To clarify, note that layer 14 of Krivokapic is a buried insulator. See Krivokapic, col. 2, lines 49-50. In order for an object to be buried, the object must be covered. See the website "<http://www.m-w.com/cgi-bin/dictionary>" of the Merriam-Webster Dictionary which defines "burying" as "to cover from view". The contrast between layers 16 and 14 in FIG. 11 of Krivokapic illustrates why layer 16 is a shallow trench isolation and why layer 14 is a buried insulator. In FIG. 11 of Krivokapic, layer 14 is covered by silicon layer 18 and is therefore a buried insulator, whereas layer 16 is uncovered and is therefore not a buried insulator but is

instead a shallow trench isolation, as specifically labeled by Krivokapic. Applicants contend, due to normal and ordinary usage of terminology in the field of semiconductors, one of ordinary skill in the art would not classify layer 16 of Krivokapic as a buried insulator but as a shallow trench isolation just as Krivokapic has done. If challenged on this issue, Applicants will have no difficulty in citing numerous issued patents which disclose a shallow trench isolation layer that is analogous to layer 16 of Krivokapic. In summary, Applicants respectfully contend that layer 16 of Krivokapic is not a buried insulator as alleged by the Examiner. Accordingly, Applicants maintain that 8 is not unpatentable over Krivokapic in view of Houston.

As a second reason why claim 8 is not unpatentable over Krivokapic in view of Houston is that Krivokapic in view of Houston does not teach or suggest the following feature of claim 8: "a semiconductor layer **overlying** a buried insulator having at least two layers" (emphasis added). The Examiner has identified layer 16 of Krivokapic as the buried insulator of claim 8, and layer 18 of Krivokapic as the semiconductor layer of claim 8. An examination of FIG. 3 or 11 of Krivokapic reveals that layer 18 of Krivokapic does not overlie layer 16 of Krivokapic but is instead inside of layer 16 of Krivokapic. Applicants note that layer 16 of Krivokapic overlies layer 18 of Krivokapic, because layer 16 circumscribes layer 18. Accordingly, Applicants maintain that 8 is not unpatentable over Krivokapic in view of Houston.

A third reason why claim 8 is not unpatentable over Krivokapic in view of Houston relates to the Examiner's argument for modifying Krivokapic with Houston's teaching. The Examiner admits that "Krivokapic fails to disclose ... a semiconductor layer overlying a buried

insulator having at least two layers" (emphasis added). The Examiner argues: "Houston discloses a semiconductor with a semiconductor layer overlying a buried insulator having at least two layers (For Example: See Figure 1). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Krivokapic to include a semiconductor layer overlying a buried insulator having at least two layers as disclosed in Houston because it aids in eliminating warping (For Example: See Column 1 Lines 49-62)".

In response to the preceding argument by the Examiner, Applicants note that the warpage in Houston referred to by the Examiner is due to a differential coefficient of thermal expansion (CTE) between the insulating layer 14 and the silicon substrate 12 as shown in FIG. 1 of Houston. Houston solves the warpage problem by structuring the layer 14 such that the CTE of the layer 14 is close to the CTE of the silicon substrate 12. See Houston, col. 1, lines 31-33; col. 1; lines 52-55; col. 2, lines 47-55. Thus, the solution of the warpage problem has nothing to do with dividing the layer 14 into multiple layers as the Examiner has alleged, but has everything to do with having a CTE for the layer 14 that closely matches the CTE of the silicon substrate 12. Thus if there is a similar potential warpage problem in Krivokapic, then Krivokapic could solve the warpage problem by choosing an insulting material for the alleged buried insulator 16 having a CTE that closely matches the CTE of silicon without the unnecessary complexity and cost of having the alleged buried insulator 16 comprise at least two layers. Therefore, one of ordinary skill in the art would not find it obvious to apply the teaching of Houston to the invention of Krivokapic.

In addition, the Examiner has not presented any analysis showing that there is a potential

warping problem in Krivokapic analogous to the warping problem in Houston in application to claim 8. The warping problem in Houston, which is due to a differential CTE between insulating layer14 and silicon substrate 12 shown in FIG. 1 of Houston, has no analogy in Krivokapic that can be applied to claim 8. Applicants note that insulating layer14 has the same geometrical relationship to silicon substrate 12 of FIG. 3 in Krivokapic as is the geometrical relationship between insulating layer14 and silicon substrate 12 in FIG. 1 of Houston. However, the Examiner has not alleged that insulating layer14 of Krivokapic is the buried insulator of claim 8. Instead, the Examiner has alleged that small trench isolation 16 of Krivokapic is the buried insulator of claim 8. However, small trench isolation 16 of Krivokapic has a totally different geometrical relationship to silicon substrate 12 of FIG. 3 in Krivokapic than is the geometrical relationship between insulating layer14 and silicon substrate 12 in FIG. 1 of Houston. Therefore, one cannot infer from Houston that there exists a potential warpage problem due to a CTE mismatch between small trench isolation 16 and silicon substrate 12 of FIG. 3 in Krivokapic. Moreover, Krivokapic does not disclose any such potential warping problem. Therefore, if there is no potential warping problem in Krivokapic that is relevant to claim 8, then it is not obvious to combine Houston with Krivokapic in application to claim 8.

Based on the preceding arguments, Applicants respectfully maintain that claim 8 is not unpatentable Krivokapic in view of Houston, and that claim 8 is in condition for allowance. Since claims 9-14 depend from claim 8, Applicants contend that claims 9-1 are likewise in condition for allowance.

Claims 15-20

Applicants respectfully contend that claim 8 is not unpatentable over Krivokapic in view of Houston for at least the following reasons.

As a first reason why claim 15 is not unpatentable over Krivokapic in view of Houston is that Krivokapic in view of Houston does not teach or suggest the following feature of claim 15:

"a silicon layer on a **buried insulator** that comprises a first buried insulator layer on a second buried insulator layer different from the first buried insulator layer" (emphasis added). The Examiner has not alleged any specific buried insulator in Krivokapic. However, the Examiner alleged that layer 16 in FIG. 11 of Krivokapic as the buried insulator of claim 8. Therefore in the absence of any contrary information, Applicants can only assume that the Examiner likewise considers layer 16 in FIG. 11 of Krivokapic as the buried insulator of claim 15. Under this assumption, Applicants respectfully contend that layer 16 of Krivokapic is not a buried insulator but is rather a shallow trench isolation. See Krivokapic, col. 2, line 63. To clarify, note that layer 14 of Krivokapic is a buried insulator. See Krivokapic, col. 2, lines 49-50. In order for an object to be buried, the object must be covered. See the website

"<http://www.m-w.com/cgi-bin/dictionary>" of the Merriam-Webster Dictionary which defines "burying" as "to cover from view". The contrast between layers 16 and 14 in FIG. 11 of Krivokapic illustrates why layer 16 is a shallow trench isolation and why layer 14 is a buried insulator. In FIG. 11 of Krivokapic, layer 14 is covered by silicon layer 18 and is therefore a buried insulator, whereas layer 16 is uncovered and is therefore not a buried insulator but is instead a shallow trench isolation, as specifically labeled by Krivokapic. Applicants contend, due to normal and ordinary usage of terminology in the field of semiconductors, one of ordinary

skill in the art would not classify layer 16 of Krivokapic as a buried insulator but as a shallow trench isolation just as Krivokapic has done. If challenged on this issue, Applicants will have no difficulty in citing numerous issued patents which disclose a shallow trench isolation layer that is analogous to layer 16 of Krivokapic. In summary, Applicants respectfully contend that layer 16 of Krivokapic is not a buried insulator as alleged by the Examiner. Accordingly, Applicants maintain that 8 is not unpatentable over Krivokapic in view of Houston.

As a second reason why claim 15 is not unpatentable over Krivokapic in view of Houston is that Krivokapic in view of Houston does not teach or suggest the following feature of claim 15: "a silicon layer on a buried insulator that comprises a first buried insulator layer on a second buried insulator layer different from the first buried insulator layer" (emphasis added). In the absence any contrary information, Applicants are assuming that the Examiner considers layer 16 of Krivokapic to be the buried insulator of claim 15 (as in claim 8), and layer 18 of Krivokapic to be the silicon layer of claim 15 (as in claim 8). An examination of FIG. 3 or 11 of Krivokapic reveals that layer 18 of Krivokapic is not on layer 16 of Krivokapic but is instead inside of layer 16 of Krivokapic. Applicants note that layer 16 of Krivokapic is on layer 18 of Krivokapic, because layer 16 circumscribes layer 18. Accordingly, Applicants maintain that 15 is not unpatentable over Krivokapic in view of Houston.

A third reason why claim 15 is not unpatentable over Krivokapic in view of Houston relates to the Examiner's argument for modifying Krivokapic with Houston's teaching. The Examiner admits that "Krivokapic fails to disclose ... a first buried insulator on a second buried

insulator different from the first buried insulator layer.” (emphasis added). The Examiner argues: “Houston discloses a semiconductor with an insulation layer that has various layers (For Example: See Column 2 Lines 43-50). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Krivokapic to include an insulation layer that has various layers as disclosed in Houston because it aids in eliminating warping (For Example: See Column 1 Lines 49-62).”.

In response to the preceding argument by the Examiner, Applicants make reference to Applicants’ third reason, presented *supra*, as to why claim 8 is not unpatentable over Krivokapic in view of Houston, said third reason based on arguments as to why it is not obvious to modify Krivokapic with the teaching of Houston in relation to claim 8. Applicants contend that said arguments also apply to claim 15.

Based on the preceding arguments, Applicants respectfully maintain that claim 15 is not unpatentable Krivokapic in view of Houston, and that claim 15 is in condition for allowance. Since claims 16-20 depend from claim 15, Applicants contend that claims 16-20 are likewise in condition for allowance.

CONCLUSION

Based on the preceding arguments, Applicants respectfully believe that all pending claims and the entire application meet the acceptance criteria for allowance and therefore request favorable action. If the Examiner believes that anything further would be helpful to place the application in better condition for allowance, Applicants invites the Examiner to contact Applicants' representative at the telephone number listed below.

Date: 11/03/2003

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